UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,045	03/22/2004	Donald J. Kouri	96605/24UTL	9997

	7590	05/17/2006

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EXAMINER
HUYNH, PHUONG

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 05/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/806,045	KOURI ET AL.
	Examiner	Art Unit	
	Phuong Huynh	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>2</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>08 March 2006</u>.

2a)☐ This action is **FINAL.** 2b)☐ This action is non-final.

3)☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-21* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *10-21* is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Drawings

1.   The subject matter of this application admits of illustration by a drawing to facilitate understanding

of the invention. Applicant is required to furnish a drawing under 37 CFR 1.81(c). No new matter may be

introduced in the required drawing. Each drawing sheet submitted after the filing date of an application

must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR

1.121(d).

Allowable Subject Matter

2.   Claims 10-21 are allowed.

The following is an examiner's statement of reasons for allowance:

- H. Abdullah and A K Louis (hereinafter "Abdullah and Louis"), "The approximate inverse for

  solving an inverse scattering problem for acoustic waves in an inhomogeneous medium",

  1999 IOP Publishing Ltd, discloses a method of approximation inverse to a two-

  dimendsional inverse scattering problem [see Abdullah and Louis: Abstract]. Further,

  Abdullah and Louis discloses a constructive method for solving the inverse problem, by

  regularizing the equation using a singular valued decompositiions (SVD) to solve the

Lippmann-Schwinger equation using quadratic integration [see Abdullah and Louis: page 1214-1217].

- Chang et al. (hereinafter Chang) (US Patent No. 6,867,866) discloses a <u>construction of a Lippmann-Schwinger equation</u> including the Green's function, zero-th order wave function and a perturbation function. Further, the Lippmann-Schwinger equation is then evaluated over a selected set of mesh points within the perturbation domain, greatly accelerating numerical evaluation of the scattering response and the resulting linear equations are solved to compute one or more reflection coefficient for the subject by using any iterative solver. [see Chang: Abstract; col. 4, lines 1-9; and col. 5, lines 10- col. 6, lines 23].

Regarding claims 14 and 18, the prior art of record fails to disclose the following claim limitation:

"calculating a transmission coefficient on a computer from:

$$t_k = 1 - \frac{ik}{2}\int_{-\infty}^{+\infty} dz\, e^{ikz} V(z)\psi_k^*(z),$$

where $V(z)$ is the location interaction between the object and $\psi_k^+(z)$ is the measuring wave,

calculating a reflection coefficient on the computer from

$$r_k = -\frac{ik}{2}\int_{-\infty}^{+\infty} e^{-ikz} V(z)\psi_k^*(z)$$

using a set of definitions:

$$t_k \tilde{\psi}_k(z) = \psi_k^+(z)$$

$$\frac{r_k}{t_k} = \tilde{r}_k$$

$$\tilde{V}_1(z) = \int_{-\infty}^{+\infty} d(2k) \frac{2i}{k} \tilde{r}_k e^{-2ikz}$$

to convert a Lippmann-Schwinger inverse scattering equation

$$\psi_k^+(z) = e^{ikz} - \frac{ik}{2} \int_{-\infty}^{+\infty} dz' e^{ik|z-z'|} V(z')\psi_k^+(z')$$

on the computer *into a Volterra-type form:*

$$\tilde{V}_1(z) = \int_{-\infty}^{\infty} d(2k)e^{-2ikz}\frac{2i}{k}r_k\left[1 + \frac{ik}{2}\int_{-\infty}^{\infty} e^{-ikz}V(z_1)\tilde{\psi}_k(z)\right]; \text{ and}$$

iterating the Volterra-type form of the Lippmann-Schwinger equation on the computer to produce an approximate solution $\tilde{V}_1(z)$, where $\tilde{V}_1(z)$ is absolutely and uniformly convergent" (emphasis added).

For at least the reasons listed above, claims 10-13,15-17, and 19-21 are also allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

3.   This application is in condition for allowance except for the following formal matters:

The subject matter of this application admits of illustration by a drawing to facilitate understanding of the invention. Applicant is required to furnish a drawing under 37 CFR 1.81(c). No new matter may be introduced in the required drawing. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d).

Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong Huynh whose telephone number is 571-272-2718. The examiner can normally be reached on M-F: 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc Hoff can be reached on 571-272-2216. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application

Information Retrieval (PAIR) system. Status information for published applications may be obtained from

either Private PAIR or Public PAIR. Status information for unpublished applications is available through

Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at

866-217-9197 (toll-free).

Phuong Huynh
Examiner
Art Unit 2857

PH
05/01/2006

MARC S. HOFF
SUPERVISORY PATENT EXAMINER
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